CLAIMS

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

1. A method of image compression comprising the steps of:

analyzing an image in terms of perceptual constructs of the human visual system;

searching for patterns among analyzed abstractions of the image;

describing the image in terms of the perceptual constructs and the patterns found among them;

for a given image that is in a same "class" as the image, re-representing the image by describing the image as a collection of parameterized versions of the patterns prevalent in that class of image;

taking a resulting description outside of the context of abstract patterns; and

looking for redundancies in the description, then re-representing the data so as to eliminate the redundancies and thereby compress the description.

2. The method of image compression recited in claim 1, wherein the patterns identified, image components, parameterization of patterns, and lower level numerical encodings are all designed around images belonging to a narrow class of images.

3. The method of image compression recited in claim 2, wherein the narrow class of images are two-dimensional projections of three-dimensional visualizations of data generated by numerical weather simulations.

1   4. The method of image compression recited in claim 1, wherein the images

2   are of the class exemplified by 2-D projections of 3-D weather model images,

3   said method further comprising the steps of:

4   re-representing entities with smoothly curved borders and an interior

5   fill that can be parameterized and is either largely derivable from other image

6   data or constant, as curve sequences and parameters required to describe the

7   interior; and

8   re-representing entity groups with constant structure that vary only in

9   terms of a spatial parameter as references to the entity group, and a list of the

10   values for the required parameters, each value being for each subsequent entity

11   for the group.

1   5. The method of image compression recited in claim 4, wherein the spatial

2   parameter is orientation or color.

1   6. A method of compression of two-dimensional projections of three-

2   dimensional visualizations of image data comprising the steps of:

3   inputting a two-dimensional image;

4   dismantling the two-dimensional image into components;

5   tracing contours by fitting parametric curves their borders;

6   tracing iso-surface projections by fitting curves to their borders;

7   representing numerical values of curve nodes as distances from one

8   another or a local origin; and

9   storing compact border and color description of contours and compact

10   border and color description of iso-surfaces.

1   7. The method of compression of two-dimensional projections of three-

2   dimensional visualizations of image data recited in claim 6, wherein the data

3   are generated by numerical weather simulations.

1   8. The method of compression of two-dimensional projections of three-

2   dimensional visualizations of image data recited in claim 7, wherein the step

3   of dismantling the input image into components includes separation of solid

4   filled contours, transparent, shaded colored two-dimensional projections of

5   three-dimensional iso-surfaces, arrow color and orientations in three-

6   dimensional space, and text and further comprising the steps of:

7   representing numerical values of arrow colors and orientations as

8   differences; and

9   storing compact color and orientation information for arrows and

10   separated text.

1   9. The method of compression of two-dimensional projections of three-

2   dimensional visualizations of image data recited in claim 8, further comprising

3   the steps of:

4   receiving the compact border and color description of contours, the

5   compact border and color description of iso-surfaces, the compact color and

6   orientation information for arrows, and text; and

7   decompressing the received information to generate a representation of

8   the original two-dimensional image.

1   10. The method of compression of two-dimensional projections of three-

2   dimensional visualizations of image data recited in claim 9, wherein the step

3   of decompressing comprises the steps of:

4   accessing a static background image representing geography and

5   drawing the background;

6   accessing a static description of arrow locations and skew, structure

7   and definition of an arrow, and received compact color and orientation

8   information for arrows and drawing arrows;

9   accessing structure and definition of an iso-surface and received

10   compact border and color description of iso-surfaces and drawing iso-surfaces;

11   accessing structure and definition of a contour and received compact

12   border and color descriptions of contours and drawing color contours; and

13   accessing received text and drawing text.